

PROCEEDINGS
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TYPE FIXATION AND VALIDATION OF CERTAIN
CALCAREOUS NANNOPLANKTON GENERA

BY ALFRED R. LOEBLICH, JR., AND HELEN TAPPAN
California Research Corporation, La Habra, California
and
University of California, Los Angeles, California

During the course of study of calcareous nannoplankton it has become evident that many genera are as yet invalidly described, lack type species, or are homonyms. In order that these genera may be useful in studies now in progress the following genera are herein validated under the *International Code of Botanical Nomenclature* (ICBN) or the *International Code of Zoological Nomenclature* (ICZN), depending on their original placement as unicellular algae or as flagellate protozoans.

Algirosphaera Schlauder, 1945, p. 22. Described with three included species: *A. oryza*, *A. spinulosa*, and *A. campanula* without selection of type species. *Algirosphaera oryza* Schlauder, 1945, p. 23, is here designated as type species.

Asterolithes Sujkowski, 1931, p. 508, 509, 617, 618. Described with eight included species, all new: *A. cayeuxi*, *A. grodnensis*, *A. niemeni*, *A. octoradiatus*, *A. polyradiatus*, *A. pyszkiensis*, *A. sexradiatus*, and *A. simplex* without selection of type species. *Asterolithes sexradiatus* Sujkowski, 1931, p. 509, 618, fig. 1 (12) (given as *A. sextiradiatus*, p. 618), is here designated as type species. As *A. sexradiatus* is a probable synonym of *Discoaster brouweri* Tan, 1926, *Asterolithes* is a junior synonym of *Discoaster*. Sujkowski reported his species to occur in Cretaceous chalk near Grodno, Poland, but they seem most likely to be of post-Cretaceous age.

Brachiolithus Loeblich and Tappan, n. gen. [proposed by Noël, 1959, p. 171, with three included centuriae (= species): *B. quadratus*, *B. pentagonus*, and *B. hexagonus*. As none was selected as type, the genus and all species are invalid (ICBN Art. 37)]. The herein validated genus is described in Noël, 1959, p. 171, and the species *Brachiolithus quadratus* Loeblich and Tappan, n. sp., herein (described by Noël, 1959, p. 171, pl. 3, fig. 25), is here designated as type species. The species and

genus occur in Jurassic Upper Portlandian to Lower Cretaceous Valanginian strata from Algeria.

Bucculinus Noël, 1957, p. 326. Described with two included species: *B. algeriensis* and *B. hirsutus*. *Bucculinus algeriensis* Noël, 1957, p. 327, pl. 4, fig. 31, 32, is here designated as type species.

Coccosphaera Wallich, 1877, p. 348 (*non Coccosphaera* Perty, 1852). Described with two included species: *C. pelagica* and *C. carterii*, neither designated as type species. *Coccosphaera pelagica* is here designated as type species. As *Coccolithophora* Lohmann, 1902, p. 93, 136, 137, is a *nomen substitutum*, it has the same type species and hence is a junior isogenotypic synonym of *Cyathosphaera* Haeckel, 1894 (see Hay and Towe, 1962 [1963], p. 507) and *Cyatholithus* Huxley, 1868.

Cribrosphaerella Deflandre, 1952, p. 462, 466. Proposed as *nom. subst. pro Cribrosphaera* Arkhangel'skiy, 1912, *non* Popofsky, 1906, with two included species, neither cited as type. *Cribrosphaera ehrenbergi* Arkhangel'skiy, 1912, p. 412, pl. 6, fig. 19 (not fig. 20) is here designated as type species for *Cribrosphaera* Arkhangel'skiy, 1912, and for the substitute name *Cribrosphaerella* Deflandre, 1952. Fig. 19 is here designated as lectotype for *C. ehrenbergi*.

Cyatholithus Huxley, 1868, p. 206. Described and figured, but without included species. *Coccosphaera pelagica* Wallich, 1877, is here designated as type species. *Coccosphaera*, *Cyathosphaera*, and *Coccolithophora* are junior isogenotypic synonyms.

Cyclolithella Loeblich and Tappan, n. name [*nom. subst. pro Cyclolithus* Kamptner, 1948, p. 3 (invalid ICBN Art. 34 & 41) and *Cyclolithus* Deflandre, 1952, p. 465, *non Cyclolithus* Koenig, 1825]. Type, *Cyclolithus inflexus* Deflandre, 1952, p. 465, text-fig. 362-B (= invalid *C. inflexus* Kamptner, 1948, p. 7).

Discoaster Tan Sin Hok, 1927, p. 412. Described with seven included species: *D. barbadiensis*, *D. ehrenbergi*, *D. hilli*, *D. brouweri*, *D. pentaradiatus*, *D. molengraaffi*, and *D. triradiatus*, none of which was selected as type species. *Discoaster pentaradiatus* Tan Sin Hok, 1927, is here designated as type species.

Discolithina Loeblich and Tappan, n. name (*nom. subst. pro Discolithus* Huxley, 1868, p. 206, *non Discolithus* Fortis, 1802). *Discolithus* was described by Huxley without originally included species. The first species to be placed in the genus were the eight included by Kamptner, 1948, p. 4: *D. pulvinus*, *D. multiporus*, *D. vigintiforatus*, *D. patera*, *D. latus*, *D. sparsiforatus*, *D. circumciscus*, and *D. staurophorus*, none of which was designated as type. *Discolithus vigintiforatus* Kamptner, 1948, p. 5, pl. 1, fig. 8, is here designated type species for *Discolithina*, as it is readily recognizable in topotype material. Vekshina, 1959, p. 65, designated *Discolithus glabrus* Vekshina, 1959, as type species for *Discolithus*, but this is an invalid type designation, because *D. glabrus* was not among the first included species.

Lecalia Loeblich and Tappan, *nom. nov.* (*nom. subst. pro Rhab-*

docyclus Lecal in Bernard and Lecal, 1960, p. 21, non Lang and Smith, 1939). Type species, *Rhabdocyclus simplex* Lecal in Bernard and Lecal, 1960, p. 21, text-fig. 2(9).

Martiniaster Loeblich and Tappan, nom. nov. (nom. subst. pro *Coronaster* Martini, 1961, p. 102, non Perrier, 1884). Type species, *Coronaster fragilis* Martini, 1961, p. 102, text-fig. 2.

Meringosphaera Lohmann, 1903, p. 68. *Meringosphaera* was described with four included species: *M. baltica*, *M. mediterranea*, *M. divergens*, and *M. hydroidea*, none of which was selected as type. In a generic revision Pascher, 1932, pp. 209–210, removed the coccolithophorid species *M. hydroidea* Lohmann, 1903 [= *Ophiaster*], from the green algal genus *Meringosphaera*. *Meringosphaera mediterranea* Lohmann, 1903, is here designated as type species for true *Meringosphaera*.

Pontosphaera Lohmann, 1902, p. 129. Described with five included species: *P. huxleyi*, *P. syracusana*, *P. haeckeli*, *P. pellucida*, and *P. inermis*, none of which was selected as type. *Pontosphaera syracusana* Lohmann, 1902, p. 129, 130, pl. 4, fig. 10, is here designated as type species.

Rhabdolithes Schmidt, 1870, p. 680. Described with no included species. *Rhabdolithes* was first proposed by Schmidt, 1870, not by Voeltzkow in 1902 as stated by Neave, 1940, p. 27, although the first species included in the genus were *Rhabdosphaera tubifer* Murray and Blackman, 1898, and *R. claviger* Murray and Blackman, 1898, by Voeltzkow, 1902, p. 493. *Rhabdosphaera claviger* Murray and Blackman, 1898, p. 438, 439 = *Rhabdolithes claviger* (Murray and Blackman) Voeltzkow, 1902, p. 493, is here designated as type species. Thus *Rhabdosphaera* Haeckel, 1894, becomes an isogenotypic synonym of *Rhabdolithes* Schmidt, 1870 (see Hay and Towe, 1962 [1963], p. 504, for type designation for *Rhabdosphaera*. The prior type designation by Vekshina (1959, p. 74) of *Rhabdosphaera elliptica* Vekshina, 1959, as type of *Rhabdosphaera* is invalid as *R. elliptica* was not among the first included species).

Syracolithus Kamptner, 1941, p. 73, 81, 101. Described with four included species: *Syracosphaera catillifera*, *S. dalmatica*, *S. quadriperforata*, and *S. schilleri*, none of which was cited as type species. *Syracosphaera dalmatica* Kamptner, 1927, p. 178, text-fig. 2, is here designated as type species.

Syracosphaera Lohmann, 1902, p. 129, 133. Described with six included species: *S. spinosa*, *S. mediterranea*, *S. pulchra*, *S. tenuis*, *S. dentata*, and *S. robusta*, none of which was selected as type species. *Syracosphaera pulchra* Lohmann, 1902, p. 133, 134, pl. 4, fig. 33, 36, 36a, b, 37, is here designated as type species.

Umbellosphaera Paasche in Markali and Paasche, 1955, p. 96. Described with two included species: *U. irregularis*, n. sp. and *U. tenuis* (Kamptner), 1937 = *Coccolithus tenuis* Kamptner, 1937, without type

citation. *Coccolithus tenuis* Kamptner, 1937, p. 311, pl. 17, fig. 41, 42, is here designated as type species of *Umbellosphaera*.

Vekshinella Loeblich and Tappan, nom. nov. (*nom. subst. pro Ehippium* Vekshina, 1959, p. 63, 69, *non* Bolten, 1798, *nec* Latreille, 1805). Type species, *Ehippium acutiferrus* Vekshina, 1959, p. 69.

Zycolithus Matthes, 1956, p. 223 [= *Zycolithus* Kamptner, 1949, p. 78, invalid (ICBN Art. 41)]. Described by Matthes but without type citation. First valid species included in the genus were *Z. bijugatus* Deflandre, *Z. diplogrammus* Deflandre, *Z. dubius* Deflandre, *Z. erectus* Deflandre, *Z. tenansa* Deflandre, and *Z. turriseiffeli* Deflandre (all 1954, in Deflandre & Fert). *Zycolithus erectus* Deflandre in Deflandre & Fert, 1954, p. 150, pl. 15, fig. 14-17, text-figs. 60-62, is here designated as type species.

Zygosphaera Kamptner, 1936, p. 244. Described originally with no included species. Kamptner, 1937, p. 305, again described the genus as new and included three species: *Z. amoena*, *Z. hellenica*, and *Z. wettsteini* without citation of type species. *Zygosphaera hellenica* Kamptner, 1937, p. 306, pl. 16, figs. 27-29, is here designated as type species.

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